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Report Highlights:
Progress continues to be made in the GMO regulatory arena in South Africa, albeit at a much slower pace than previous years. In 2007, four trial release permits, three general release permits (cotton –Monsanto RRFlex and Monsanto BGIIXRR flex; Maize Mon810XNK603), and one contained use permit (ARC developed -starch enhanced cassava) were issued.

Includes PSD Changes: No
Includes Trade Matrix: No
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[SF]

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Executive Summary

While area planted with GMO varieties increased over 30 percent from 2006, there has not been much change to South Africa's biotechnology regulations from 2007. Recent Amendments to the GMO Act of 1997 have not been implemented, as guidelines for their implementation have not been published.

U.S. corn is still not authorized entry into the Republic of South Africa, as the long awaited economic impact study by the Department of Trade and Industry has not been completed. U.S. Government funded research on the Bt potato is now bearing fruit, as the SpuntaG2 variety is being reviewed for general release authorization. Additionally, GMO grapevines, developed in South Africa, are being reviewed for field trial permits.

Over the next year it is possible transgenic sorghum will re-apply for contained use permits if changes are made to the containment level to be employed.

Progress continues to be made in the GMO regulatory arena in South Africa, albeit at a much slower pace than previous years. In 2007, four trial release permits, three general release permits (cotton –Monsanto RRFlex and Monsanto BGIIXRR flex; Maize- Mon810XNK603), and one contained use permit (ARC developed -starch enhanced cassava) were issued.

Biotech Trade and Production

South African farmers plant genetically modified (GM) corn, cotton, and soybeans. Due to increased producer acceptance of biotech crops, sales of biotech seeds in South Africa, biotech crop production continues to expand at an amazing rate. In 2007, biotech maize, soy, and cotton planted areas increased 30 percent from 2006 to approximately 1.8 million hectares.

The majority of this increase was in maize, both yellow and white, which reached 1.6 million HAS, up from 2006's planted area of 1.2 million HAS. Of this total planted area, 57 percent was biotech.

In 2007, total biotech white maize area, for food use, reached 1.04 million hectares (has), an increase of 48 percent over 2006 area (702,000 HAS). Biotech yellow maize area, used for animal feed, increased about 7 percent to approximately 570,000 HAS.

The most popular biotech event in South Africa in 2007 was Bt insect resistant maize (1.1 million HAS). Herbicide tolerant maize (RR) was the second most popular with 373,000 HAS. In 2007, stacked trait (BtxRR) maize sales began and reached 80,000 HAS.

Biotech soybean area reached 144,000 HAS (80 percent of total planted area of 180,000 HAS). Cotton area showed the highest biotech adoption rate of 90 percent. Total cotton planted area was 10,000 HAS, ninety percent of which was biotech.

Biotech crops under development

Grapevines

The South African wine and table grape industries are funding research on develop GMO grapevines. The research is focusing on the development of fungal and viral resistant vines and the metabolic engineering of grapevines towards enhanced environmental stress resistance and improved grape berry quality factors such as color and aroma. Several transgenic grapevine lines are being evaluated in greenhouse trials. In 2006, the Institute

for Wine Biotechnology at Stellenbosch University applied for a permit to perform the first GM grapevine field trials in South Africa. They proposed to graft transgenic grapevine plants on non-transgenic rootstocks.

The objectives of the trial were to evaluate the morphology, growth, and fruit quality of the transgenic plants under field conditions. In September 2007, the Advisory Committee (AC) evaluated the application and a list of questions about the trial was referred back to the applicant. The response of the applicant is still outstanding and the final decision by the EC on the application is still pending.

Bt Potato

The tuber moth resistant potato, SpuntaG2, was developed in collaboration between Michigan State University and the South African Agricultural Research Council (ARC), and funded by USAID. In July 2008, an application was submitted to the GMO Registrar for general release and is being reviewed. At the same time, per regulations, public notices have been published in local newspapers and are open for comment.

Once the SpuntaG2 event is approved and registered, the ARC will conduct farmer participatory trials with small holder farmers. If there are requests for SpuntaG2 planting material from commercial farmers, variety registration and licenses for production of disease-free planting material will be negotiated so that seed-potato producers can provide planting material that is certified by the Potato Certification Services of SA.

Cassava

South Africa's Agricultural Research Council (ARC) received authorization for contained use of a starch enhanced cassava variety. The main goal of this crop is to produce an industrial starch crop, as a means to improve jobs and income for South Africa and the region. USAID/South Africa obligated $800,000 over two years (2004 and 2005) to this research and the initial focus was on further development and roll-out of a transgenic pest resistant variety of cassava for use as industrial starch. The project is being managed by Michigan State University in collaboration with the CGIAR.

GM crops that SA imports

South Africa imports several GM crops/products from the United States. Please see Appendix A for the complete list of approved varieties.

Food Aid

South African policy makers feel that they don't need food aid, as they are a surplus producer, and SA does not currently accept food aid donations. In fact, SA donated corn to Zimbabwe in 2003 during that country's famine.

However, U.S. food aid destined to Lesotho, Malawi, Swaziland, Zambia and Zimbabwe ordinarily passes through the port of Durban, South Africa. In order for the shipment to pass through South Africa, the GMO Registrar's Office requires several measures:

- Advance notification so that proper containment measures can be taken;
- Letter from the recipient country stating that they accept the food aid consignment and that they know that it contains GMOs;
- Milling near the port. Southern African Development Community (SADC) regulations state that if food aid has biotech content then it must be milled.

Crops from Outside the United States

South Africa does not commercially produce any biotechnology crops that were developed outside of the United States at this time. Some in the pipeline, namely the Bt potato, developed in a partnership between the Agricultural Research Council (ARC), and Michigan State University (MSU), and drought resistant maize and soybeans could be planted commercially in the next few years.

Biotechnology Policy

GMO Act of 1997

South African biotechnology policy is formulated under the Genetically Modified Organisms (GMO) Act of 1997. This act was modified by cabinet in 2005 to bring it in line with the Cartagena Biosafety Protocol (CBP) and again in 2006 in order to address some economic and environmental concerns.

The aforementioned amendments to the GMO Act of 1997 were published and gazetted on April 17, 2007. Implementing guidelines, however, have not been published. These amendments are said to be administrative in nature, but there a few substantive changes that may impact the current biosafety regulatory system. A study conducted for the USAID/Program for Biosafety Systems' (PBS) South Africa program and implemented by the International Food Policy Research Institute (IFPRI) and AfricaBio found the following possible impacts[1]:

The Executive Council (EC) membership, which is responsible for making regulatory decisions, was increased from 6 to 8 members by adding representatives from the Department of Arts and Culture and the Department of Water Affairs and Forestry. Currently, the EC is made up of the following representatives:

- Department of Agriculture,
- Department of Science and Technology,
- Department of Environment and Tourism,
- Department of Trade and Industry,
- Department of Health; and,
- Department of Labor.

The addition of two new representatives to the EC may seem purely administrative, but it could potentially impact the work of the EC. The new representatives may not have significant knowledge of biotechnology and biosafety, nor have any interest in the subject. Additionally, because the EC functions by consensus and each member has the right to veto a decision it does not endorse, it may be more difficult to get a quorum to have an EC meeting and to reach consensus decisions. This could delay decisions on permit applications. Another amendment to the GMO Act authorizes the EC to determine if an environmental impact assessment (EIA) is required under the National Environmental Management Act. This provision provides the EC with significant power to decide if an Environmental Impact Assessment, which can be costly and time consuming, is required. Additionally, since the EC works on consensus, if one representative of the EC wants an EIA done, it would be required.

[1] Jaffe, Gregory, "Analysis of Recent Legislation Affecting South Africa's Biosafety Regulatory System and Recommendations to improve South Africa's Current Biosafety Regulatory System", August 27, 2007.

The amendments also add specific legislation to allow socio-economic considerations to factor into decision making and makes those considerations significantly important in the decision making process.

A final change that could impact the functioning of the GMO approval process is a statement in the GMO Amendments Act that deems the summary of the scientifically based risk assessment of the impact on the environmental and human and animal health cannot be kept confidential. The release of this information to the public may provide more transparency and public participation, but could also add cost and time to the regulatory process for the applicants and the Registrar.

National Environmental Management Biodiversity Act

The National Environmental Management Biodiversity Act (Biodiversity Act) of 2004 was established to protect South Africa's biodiversity from specific threats and includes GMOs as one as those threats. It also ensures there is a sharing of benefits from South Africa's biological resources.

Section 78 of the act gives the Minister of Environmental Affairs and Tourism the power to deny a permit for general or trial release applied for under the GMO Act, if the GMO may pose a threat to any indigenous species or the environment, unless an environmental assessment has been conducted.

There have been relatively few GMO environmental assessments conducted as a result of the requirements of the Biodiversity Act. However, if the Minister deems it necessary, and it is not clear under what criteria that decision would be made, an expensive and time-consuming process would have to be completed before the EC could move forward with the GMO permit application.

Because of the Biodiversity Act, DEAT's role in the EC has been altered from their original participation in the EC. DEAT's responsibility to ensure that GMOs are correctly assessed and do not pose a risk to the environment has forced them to ask more pointed questions and request more data before deciding on the status of new GMO permits.

SANBI and Biodiversity

The Biodiversity Act also requires the South African Biodiversity Institute (SANBI) to monitor and report regularly to the Minister of DEAT on the impacts of any genetically modified organism that has been released into the environment. The legislation requires reports on the impact of non-target organisms and ecological processes, indigenous biological resources and the biological diversity of species used for agriculture.

Even though SANBI is just recently establishing itself in this new role, additional monitoring obligations have been required by the GMO Registrar in order to issue permits. The EC has not clearly defined the types of environmental monitoring that would be required. Nor, has the purpose of that monitoring been established. There have been ongoing discussions in the EC to resolve the issue.

Field Testing

South Africa does allow field-testing of GM crops. According to a recent court ruling, the DoA must inform the public which crops are currently undergoing field trials in SA but does not have to provide details about where the trials are taking place.

In 2007, the DoA issued only 4 permits for GM field trials. These permits were for drought resistant maize (, cotton (BGIIxRR Flex – Mon15985x Mon 88913), Maize GA21, and Maize MON89034 X NK603. So far in 2008, not trial release applications have been approved. Time to commercialization can not be estimated.

Stacked Events

While in the past, SA required an additional approval for a plant that combines two already approved traits, such as herbicide tolerance and insect resistance. This requirement meant that companies effectively needed to start from the beginning of the approval process for stacked events, even when the individual traits had already been approved. There have been slight changes to the processing of stacked events over the past year, and approvals for stacked events have been quicker than many applicants anticipated. This has meant that some applicants with approved stacked events will not be able to market the product this year, and hope to ramp up seed production and distribution in order to be planted by next year.

In October 2005 Monsanto received DoA approval to launch stacked-gene cotton in South Africa. The seed combines an insecticide with a built-in resistance to weed-killer. The stacked-gene variety was created using conventional breeding techniques in which hybrid cotton was created by crossing insect-resistant plants with herbicide-tolerant ones.
In March 2007 Monsanto SA received “general release” permit clearance for Mon 810 x NK 603. Monsanto decided to market the stacked maize product in South Africa after the farmers’ positive response to the cotton stacked gene seed.

Coexistence

Coexistence has not been an issue that has necessitated the introduction of specific guidelines or regulations in South Africa. South Africa does not currently have a National Organics Standard in place, but should have a draft legislation in place by the end of 2008. South African farmers do grapple with the issue of co-existence on the same farm, especially when growing both yellow and white corn. White corn, which is primarily for human consumption, often commands a higher price/ton than yellow and tolerates a 3% adventitious presence of yellow kernels before it is down graded to the price of yellow corn. In order to protect their white corn, farmers utilize spatial or temporal isolation to restrict cross-pollination. For example, if a farmer were contracted to produce non-transgenic corn then he would discuss this issue with a neighbor or plant a buffer zone of corn between plantings if the surrounding corn is transgenic. The government leaves the management of the approved GM field crops to the farmers. Soybeans and cotton, the only other two approved transgenic crops, are virtually self-pollinating and therefore are not a concern for contamination.

Labeling

Health regulations published in 2004 largely follow Codex Alimentarius scientific guidelines. They mandate labeling of GM foods only in certain cases, including when allergens or human/animal proteins are present, and when a GM food product differs significantly from a non-GM equivalent. The rules also require validation of enhanced-characteristic (e.g., “more nutritious”) claims for GM food products. The regulations do not address claims that products are GM-free.

Biosafety Protocol

SA has signed and ratified the Cartagena Protocol on Biosafety (CPB). The primary responsibility for implementing the CPB has shifted from the Department of Environmental Affairs and Tourism to the Department of Agriculture (DoA). CPB implementation is meant to be gradual, and accordingly DoA's implementation will be in phases, with the most significant issues being handled first. SA, under the leadership of DoA's GMO Regulatory Office, has modified its GMO act to comply with the CPB.

The CPB will likely slow down trade with its additional bureaucratic requirements but will likely not diminish trade in GMOs in the long run.

Biotechnology-related Trade Barriers

For stacked events, companies need to start from the beginning of the approval process, even when the individual traits have already been approved. The lengthy process, more than the actual legislation, is a barrier for exporting U.S. GM products to SA. For example, it is very difficult to export U.S. corn to South Africa because they haven't yet approved several varieties that are grown in the United States—without including stacked events. SA isn't opposed in principle to these events; they just haven't made it through the regulatory approval process yet.

In response to Grain SA's (a farmers' union) complaints over low grain prices in 2006, the EC agreed to commission a study by the Department of Trade and Industry (DTI) on the potential impact of the commodity clearance of GM imports on South Africa trade. All current and new applications to the GMO Registrar's office for "commodity clearance" (as opposed to products intended for "general release" such as the stacked gene in maize) approval of GM grain have been pending the outcome of this study. DTI's mandate is to ascertain the trade and price implications of the importation of GM maize. The study was supposed to be completed in March 2006 but it has yet to be completed.

South African Government insiders do not believe the embargo will be lifted because they believe "local farmers and consumers will suffer" when governments allow imported products to enter the country.

Since the United States has approved biotech events that are not authorized in South Africa, U.S. commodity imports will not be granted commodity clearance permits until the socio-economic study is concluded. Commodities that contain biotech events that are already approved in South Africa have not been affected.

Technology Fees

Biotechnology companies operating in South Africa follow essentially the same procedure for collecting technology fees that they follow in America. This policy generally works because South Africa is a signatory to the Trade-Related Aspects of International Property Rights (TRIPS) agreement of the WTO. Trade sources relate that cotton and corn are such that farmers have to buy new seed every year. Farmers sign a one-year licensing agreement, and the technology fee is included in the price of the bag of seed for these crops. Soybeans are more difficult. Technology developers try to collect the fee from the farmers when they deliver the harvest to the terminal. This fee can be difficult to collect because soybeans are open pollinated so seed need not be purchased each year. Also farmers often use soybeans for feed right on the farm so they might never enter commercial circulation. This challenge is not unique to South Africa, but rather is due to the intrinsic nature of the soybean.

Biosafety Platform

An effort is under way to establish a national biosafety platform. The mission of the platform is:

- Ensure access to regulatory and biosafety information, data and services.
- Stimulate and facilitate strategic biosafety research and risk assessment studies.
- Increase SA's capacity for (GMO) risk assessment through skills development and funding.
- Forging partnerships with individuals, organisations and countries where these collaborative efforts will lead to safer products and more efficient systems.
- Stimulate sustainable growth in the local biotechnology industry by ensuring regulatory compliance of biotechnological (GM) products.

The mission would be accomplished through a variety of activities including:

- Guidance and assistance to all stakeholders to help ensure compliance with the regulatory and biosafety requirements across all the stages of GMO research and development e.g. contained use, field trials and commercial release.
- Identification and commissioning of strategic biosafety research in a South African context that would feed into regulatory submissions at a later stage.
- Facilitating, managing and funding regulatory compliance projects, i.e. compilation of regulatory dossiers in collaboration with the technology developers.
- Management and dissemination of information related to all aspects of the biosafety and risk assessment of biotech products in the South African context.
- Capacity building in biosafety research and assessment by training researchers and decision makers and leveraging additional funds for biosafety research.

Bioprospecting

While not directly related to biotechnology, bioprospecting regulations could affect research and development efforts by persons wishing to remove flora or fauna from the South African Republic. These regulation have not yet been approved by the Minister of Environmental Affairs and Tourism.

The regulations on Bioprospecting, Access and Benefit Sharing were developed in terms of Chapter 6 , 7 and section 97 (1)d ,e ,f ,g &h of the National Environmental Management: Biodiversity Act (Act no. 10 of 2004) (NEMBA). The purpose of the regulations is to:

- further regulate the permit system set out in Chapter 7 of the Act insofar as that system applies to bioprospecting involving any indigenous biological resources or export from the Republic of any indigenous biological resources for the purpose of bioprospecting or any other kind of research, and;

- set out the contents of, the requirements and criteria for benefit-sharing and material transfer agreements.

The regulations provides for three types of permits, namely:

a) Bioprospecting Permit. This permit is only issued if the envisaged bio-prospecting project will be done in South Africa using indigenous biological resources; the permit is issued by the Minister.

b) Integrated export and bio-prospecting Permit. This permit is only issued if the envisaged bio-prospecting project will be done in a foreign country using indigenous biological resources to South Africa; the permit is issued by the Minister

c) Export Permit for research other than bio-prospecting. This permit is only issued if the envisaged research project will be done in a foreign country using indigenous biological resources to South Africa. (N.B this only applies to the investigation of indigenous biological resources in order to generate scientific knowledge). This permit is issued by the relevant MEC if the indigenous biological resources to be exported are collected, gathered or curated in that province.

In order to obtain a bio-prospecting related permit, an applicant must:

- identify the relevant person, organ of state or community who will provide access to the indigenous biological resources and enter into a material transfer agreement and benefit-sharing agreement based on full disclosure of material information; and,

- If the project was initiated by or will make use of traditional knowledge, discoveries or use of an indigenous community in respect of the indigenous biological resources to which the application relates, the applicant must enter into a benefit-sharing agreement with that community.

These agreements must be approved by the Minister.

Provision is made in the Regulations for any person involved in bio-prospecting project that has already commenced to apply for a bio-prospecting permit within six months from the date of coming into effect of these regulations which is 1 April 2008.

Failure to comply with the Regulations will result in imprisonment not exceeding five years, an appropriate fine, or both a fine and such imprisonment.

Marketing

Producers, Seed Companies, and Importers

South African farmers can be divided into two categories. Commercial farmers, usually white, are modern businessmen who sometimes have more in common with their American counterparts than with their fellow, more traditional Africans. Subsistence farmers are usually black and have small, household farms. GM products have a wide appeal with both groups. Each group appreciates that GM crops use fewer inputs and have higher yields. In fact, subsistence farmers find some GM crops easier to manage than traditional or hybrid varieties.

Seed companies have found that subsistence growers are an important market for GM crops. Distributors should be from the local area, speak the local language, and they should take time to talk with people and explain the technology and its benefits. When this care is taken, small-scale growers are generally receptive to new technologies.

Importers require assurance that no unapproved GM varieties are inadvertently contained in the shipment because South Africa's regulation for adventitious presence is only 1 percent. Yet, in reality their tolerance is zero, since the GMO Registrar's office won't grant an import approval for a shipment coming from a country that cultivates events that aren't approved in South Africa; if the product is milled or otherwise processed it can usually enter.

Getting the Word Out

In 2008, AfricaBio marked over 5 years of GM maize demonstration trials. These trials showed that, on average, yields increased by more than 20 percent. On over 53 demonstration sites in six provinces, over 2,000 small scale farmers, 180 agricultural extension officers and 75 agricultural decision makers received extensive training in Bt maize cultivation.

The plots consisted of 1 hectare Bt maize (stalk borer resistant) and 1 hectare non-Bt (conventional) maize. Farmer's Days, conducted in the local language (South Africa has well over 12 local languages), gave emergent farmers a hands-on look at the differences of the two crops. Over the five years, cob damage by stalk borer averaged 6 percent in the Bt maize plots, compared to more than 14 percent damage in conventional maize plots.

Small scale farmers can see the real benefit of using GM maize seed, along with good farming practices, as increases to their profits. In the Eastern Cape, over 500 small-scale farmers adopted GM maize and planted on an an average of 2.5 has each. Average yields increased over 220 percent the first year and sales of surplus maize increased average income to 2,825 rands. With just 20 farmers earning this additional income, and there were many more, more than R56,500 of disposable income was spent in the informal sector of the community.

These small-scale, emergent farmers have shown that even though there may be a lack of infrastructure, roads, and transportation in rural areas, one man can easily carry a 25 kg bag of Bt maize seed, plant it, and harvest enough to feed themselves and sell of surpluses to ensure food sustainability, poverty alleviation, and a better life for many.

Consumers

The PUB's (see more details in Section III) biotechnology survey shows that most South Africans have no knowledge of biotechnology. This finding is not surprising given that most South Africans are more concerned with the price of food than with how it was grown. What is interesting is that despite this lack of understanding, an average of 57 percent indicated that different applications of biotechnology should continue[2]. The survey was launched on April 6, 2005 and concludes that the country needs better science communication about biotechnology so that people can have a clearer picture of how it affects their lives.

"We hope this will empower them to become participants in this area of science," said Helen Malherbe, coordinator of the Public Understanding of Biotechnology program, which ran the study in collaboration with another government-funded entity, the Human Sciences Research Council.

Although South African scientists are among their continent's leaders in biotechnology, the survey showed that the term "biotechnology" means nothing to 82 per cent of the general public. A similar proportion is unaware of the meanings of 'genetic engineering', 'genetic modification' and 'cloning'. The study, in which researchers interviewed 7,000 people in the language of the participant's choice, was designed to be representative of the adult population of South Africa. It reveals that even among the few South Africans who were aware of biotechnology, most were indifferent to it.

Malherbe said notable findings were that nearly half of those interviewed wanted to know

[2] www.pub.ac.za

more about medical uses of biotechnology, and about one-quarter wanted more information on genetically modified food and other agricultural uses of biotechnology.

When asked who they most trust to tell the truth about biotechnology, 24 per cent of interviewees said universities, 19 per cent said the media, and 16 per cent said the government. Respondents were even less likely to trust consumer groups, environmental organizations, religious groups, or the biotechnology industry.

A University of Cape Town virologist says the survey revealed "a huge gap between science and society". He suggests using everyday products of biotechnology such as milk and cheese as educational tools in public outreach at shopping malls and other local centers to increase public awareness.

Capacity Building and Outreach

USAID/South Africa and the regional USAID/Southern Africa did not receive any funding for biotechnology projects in FY08. It is unlikely they will receive funding for FY09 either. There were some periodic activities funded by USAID/Washington, under the PBS project, which took place throughout the year. These activities are implemented usually through AfricaBio. AfricaBio is a non-governmental, non-political and non-profit biotechnology organization based in South Africa that advocates for stakeholders in the research and development, production, processing and consuming sectors. The bulk of its funding comes from the private sector. USAID and other U.S. organizations provide periodic funding for training and capacity building activities and production of biotechnology informational materials.

OAA/Pretoria, with funding from the State Department's Economic Bureau, brought a speaker from APHIS/BRS to speak on risk assessment and give a presentation at the AfricaBio biosafety course, among other activities, in Pretoria, South Africa from September 16 – 27 2007. The speaker is a communication specialist in the communication and international affairs branch of BRS' Policy Coordination Program.

Upcoming Activities:

Again this year, OAA/Pretoria received funds from State Department/Economic Bureau, to bring a speaker from the United States. In September 2008, an EPA representative will spend one week in South Africa, focusing on risk analysis with the GMO EC, the AC, and other interested individuals.

Additionally, OAA/Pretoria, is planning two seminars in August 2008, one in Madagascar and one in Mozambique, to focus on basic biosafety. These seminars would use a speaker from the United States, as well as a regulatory official from Argentina, to speak on regulation of biotechnology, international agreements and their implications in biotechnology regulation.

Country Specific Needs:

Regulatory stabilization and streamlining should be a focal point to capacity building activities in South Africa. These activities could include:

- Regular interaction and information exchange with regulators on GMOs,
- Interactions with portfolio committees in parliament, and;
- Regular interaction one on one with chair persons of committees.

There is also a continued need for biotechnology capacity building in the EC and, to a lesser extent, AC and their superiors and supporting personnel. Some members of the EC are hindered in their decisions by the desires of their superiors, while others may have no involvement of their superiors in their decisions expressed in the EC, and thereby could be characterized as 'loose-cannons'. Increasing awareness at all levels of the departments and ministries represented on the EC could lead to better, more sound decision making.

Additionally, outreach to small scale farmers on the benefits of biotechnology, specifically Bt maize should also be a focus. Expanding this outreach to include consumer groups and the general public could achieve greater understanding and acceptance of biotechnology.

Resources

AfricaBio: www.africabio.com

Asian Development bank: www.adb.org

Agbiotechnet: www.agbiotechnet.com

South African Agency for Science and Technology Advancement: www.fest.org.za

Department of Science and Technology: www.dst.gov.za

Department of Agriculture: www.agri

Agricultural Research Council: www.arc.agric.za

Public Understanding of Biotechnology: www.pub.ac.za

Southern Africa Development Community: www.sadc.inc

International Service for the Acquisition of Agri-biotech Applications: www.isaa.org

Focus on the Global South: www.focusweb.org

Intermediate Technology Development Group: www.itdg.org

South Center: www.southcenter.org

Third World Network: www.twnside.org.sg/bio.htm

International Service for the Acquisition of Agri-Biotech Applications: www.isaaa.org

APPENDIX A. TABLE OF APPROVED BIOTECHNOLOGY PRODUCTS

Crop	Trait Category	Applicant (s)	Event (s)	Trait Description(s)	Reviewed uses within South Africa
Cotton	Insect resistant	Monsanto	Bollgard II, line 15985		**General release**
Maize	Insect resistant	Syngenta	Bt11	Produced by inserting the *cry1Ab* gene from *Bacillus thuringiensis* subsp. kurstaki,	**General release**
Maize	Herbicide tolerant	Monsanto	NK603	Introduction, by particle bombardment, of a modified 5-enolpyruvyl shikimate-3-phosphate synthase (EPSPS)	**General release**
Soybean	Herbicide tolerant	Monsanto	GTS40-3-2	enolpyruvylshikimate-3-phosphate synthase (EPSPS) encoding gene from the soil bacterium *Agrobacterium tumefaciens* .	**General release**
Cotton	Herbicide tolerant	Monsanto	RR lines 1445 & 1698	Glyphosate herbicide tolerant cotton produced by inserting a glyphosate tolerant form of the enzyme 5-enolpyruvyl shikimate-3-phosphate synthase (EPSPS) from *A. tumefaciens* strain CP4.	**General release**
Cotton	Insect resistant	Monsanto	Line 531 / Bollgard		**General release**
Maize	Insect resistant	Monsanto	MON810 / Yieldgard	Inserting a truncated form of the *cry1Ab* gene from *Bacillus thuringiensis* subsp. kurstaki HD-1.	**General release**
Maize	Insect resistant Herbicide tolerant	Monsanto	MON810 x NK603		**General release**
Cotton	Herbicide Tolerant	Monsanto	RR Flex		**General Release**
Cotton	Insect Resistant Herbicide tolerant	Monsanto	BGIIXRRFlex		**General Release**

Maize	Insect resistant Herbicide tolerant	Monsanto	MON810 x GA21		**Commodity clearance**
Maize	Insect resistant Herbicide tolerant	Pioneer Hi-Bred	TC1507	Produced by inserting the *cry1F* gene from *Bacillus thuringiensis* var. *aizawai* and the phosphinothricin N-acetyltransferase encoding gene from *Streptomyces*	**Commodity clearance**
Maize	Herbicide tolerant	Monsanto	NK603	Introduction, by particle bombardment, of a modified 5-enolpyruvyl shikimate-3-phosphate synthase (EPSPS)	**Commodity clearance**
Maize	Herbicide tolerant	Monsanto	GA21		**Commodity clearance**
Maize	Insect resistant	Syngenta	Bt11	Produced by inserting the *cry1Ab* gene from *Bacillus thuringiensis* subsp. kurstaki,	**Commodity clearance**
Maize	Herbicide tolerant	AgrEvo	T25		**Commodity clearance**
Maize	Insect resistant	Syngenta	Bt176		**Commodity clearance**
Oilseed rape	Herbicide tolerant	AgrEvo	Topas 19/2, Ms1Rf1, Ms1Rf2, Ms8Rf3		**Commodity clearance**
Soybean	Herbicide tolerant	AgrEvo Aventis	A2704-12	Glufosinate ammonium herbicide tolerant soybean produced by inserting a modified phosphinothricin acetyltransferase	**Commodity clearance**
Cotton	Insect resistant	Syngenta	Cot 102/ Cry1Ab		**Trial release**
Maize	Herbicide tolerant	Syngenta	GA21		**Trial release**
Cotton	Herbicide tolerant	Syngenta	Heb 134001-134100		**Trial release**
Vaccine		Cato Research	VRX496		**Trial release**
HIV vaccine	Vaccine	MSD	MRK Ad5		**Trial release**

Sugar-cane	Increased carbohydrate content	SASEX	1-2-3-3		**Trial release**
Cotton	Herbicide tolerant	Monsanto	MON88913 (RR flex enhanced RR)		**Trial release**
Cotton	Insect resistant Herbicide tolerant	Monsanto	MON88913 x Bollgard II		**Trial release**
Maize	Herbicide tolerant	CSIR	Safe Maize		**Trial release**
Maize	Insect resistant Herbicide tolerant	Monsanto	MON810 x NK603		**Trial release**
Maize	Insect resistant	Syngenta	3243M		**Trial release**
Cotton	Herbicide tolerant	Syngenta	Glyphosate resistant		**Trial release**
Soybean	Drought resistant	ARC	P5CR		**Trial release**
Cotton	Insect resistant	Syngenta	COT102, lines 3169, 3826-3829		**Trial release**
Cotton	Insect resistant	Calgene	Stacked Bt event		**Trial release**
Cotton	Insect resistant Herbicide tolerant	Stoneville	Stacked Bollgard II & RR (1445)		**Trial release**
Cotton	Insect resistant	Syngenta	COT101, COT102, line 3169		**Trial release**
Cotton	Herbicide tolerant	Stoneville	LL25		**Trial release**
Potato	Insect resistant	ARC	Bt event		**Trial release**
Maize	Insect resistant	Pioneer Hi-Bred	TC6228		**Trial release**

Maize	Insect resistant Herbicide tolerant	Aventis	ZMA101		**Trial release**
Sugar-cane	Insect resistant Herbicide tolerant	University of Natal	Glufosinate ammonium		**Trial release**
Potato	Insect resistant	First potato Dynamics	*Bt event		**Trial release**
Maize	Herbicide tolerant	Monsanto	*NK603	Introduction, by particle bombardment, of a modified 5-enolpyruvyl shikimate-3-phosphate synthase (EPSPS)	**Trial release**
Maize	Herbicide tolerant	AgrEvo	T25		**Trial release**
Wheat	Herbicide tolerant	Monsanto	RR		**Trial release**
Maize	Insect resistant	Pioneer Hi-Bred	*TC1507	Produced by inserting the *cry1F* gene from *Bacillus thuringiensis* var. *aizawai* and the phosphinothricin N-acetyltransferase encoding gene from *Streptomyces viridochromogenes* .	**Trial release**
Cotton	Insect resistant Herbicide tolerant	Monsanto	*Stacked Bollgard I & RR		**Trial release**
Maize	Insect resistant	Monsanto	*Stacked MON84006		**Trial release**
Soybean	Herbicide tolerant	Monsanto	*GTS40-3-2	produced by inserting a modified 5-enolpyruvylshikimate-3-phosphate synthase (EPSPS) encoding gene from the soil bacterium *Agrobacterium tumefaciens* .	**Trial release**
Cotton	Herbicide tolerant	Monsanto	*BXN		**Trial release**
Canola	Herbicide tolerant	AgrEvo	*Ms8Rf3		**Trial release**
Maize	Herbicide tolerant	Monsanto	*GA21		**Trial release**

Cotton	Insect resistant	Monsanto	*Bollgard I		**Trial release**
Cotton	Insect resistant	Monsanto	*Bollgard II Line 15985		**Trial release**
Maize	Insect resistant	Novartis (Syngenta)	*Bt 11	Produced by inserting the *cry1Ab* gene from *Bacillus thuringiensis* subsp. kurstaki,	**Trial release**
Maize	Abiotic Stress (drought tolerance	Monsanto			**Trial release**
Cotton	Insect Resistance Herbicide Tolerant	D&PL	Mon15985XMon 88913		**Trial Release**
					Trail Release
Maize	Herbicide tolerant	Syngenta	GA21		
Maize	Herbicide tolerant Insect resistant	Monsanto	Mon89034XNK603		**Trial Release**
Maize	Herbicide tolerant	Dow Agroscience	DAS 1507		**Importation Contained use**
C. gluta-micum AM919	Amino acid (isoleucine production)	SA Bioproducts			**Importation Contained use**
E.coli VNII	Amino acid (threonine) production	AECI Bioproducts			**Importation Contained use**
Maize	Insect resistant	Pioneer Hi-Bred	TC6228		**Importation Contained use**
Cassava	Starch Enhanced	ARC-IIC			**Importation Contained use**

*Approvals originally granted under an amendment of the Agricultural Pest Act, 1983

Note: Approvals are granted for a specific period only. Thus, not all the events listed above are being tested at this moment.